# A Summary of the I-PLACE3S Model

I-PLACE3S is a web-based modeling platform for scenario planning. It can evaluate how alternative development approaches or transportation investments may impact a number of indicators, including transportation patterns, energy usage, cost efficiency, and climate change. I-PLACE3S analysis is conducted through a web-based map display. This strong visual component and interactivity supports scenario development and testing by non-technical users in settings such as public workshops, as well as in more technical settings.

I-PLACE3S was developed in the public sector by the California Energy Commission (CEC), the California Department of Transportation and the U.S. Department of Energy, and is currently managed by the Sacramento Council of Governments (SACOG). The current version I-PLACE3S is an overhaul of the PLACE3S model, which was initially developed in the early 1990s. I-PLACE3S is currently managed by the SACOG, and a private company provides programming, maintenance and web hosting.

I-PLACE3S has a number of key advantages as a modeling platform:

**INTERACTIVITY:** I-PLACE3S supports interactive workshops to meaningfully involve stakeholders and quantitatively evaluate numerous, complex planning issues within a collaborative setting. From an administrative perspective, because I-PLACE3S is accessed through a server, there is only one dataset to maintain and update, and access can be secured to maintain quality control.

**INTERNET-BASED USER INTERFACE:** Because it is an internet-based system, no specialized hardware or software is required to operate I-PLACE3S. Particularly for public health staff, who may not be trained in or have access to a GIS (Geographic Informations System) platform, this feature will allow more in-depth participation and insights into the planning process.

**I-PLACE$^3$S INDICATORS**

Employees
Dwelling units
Population
Water consumption
Jobs by sector
Vehicle trips per household
Vehicle miles traveled per household
Transit ridership
Pedestrian friendliness
Pedestrian and bike trips.
Electricity / natural gas / gasoline demand
Return on Investment

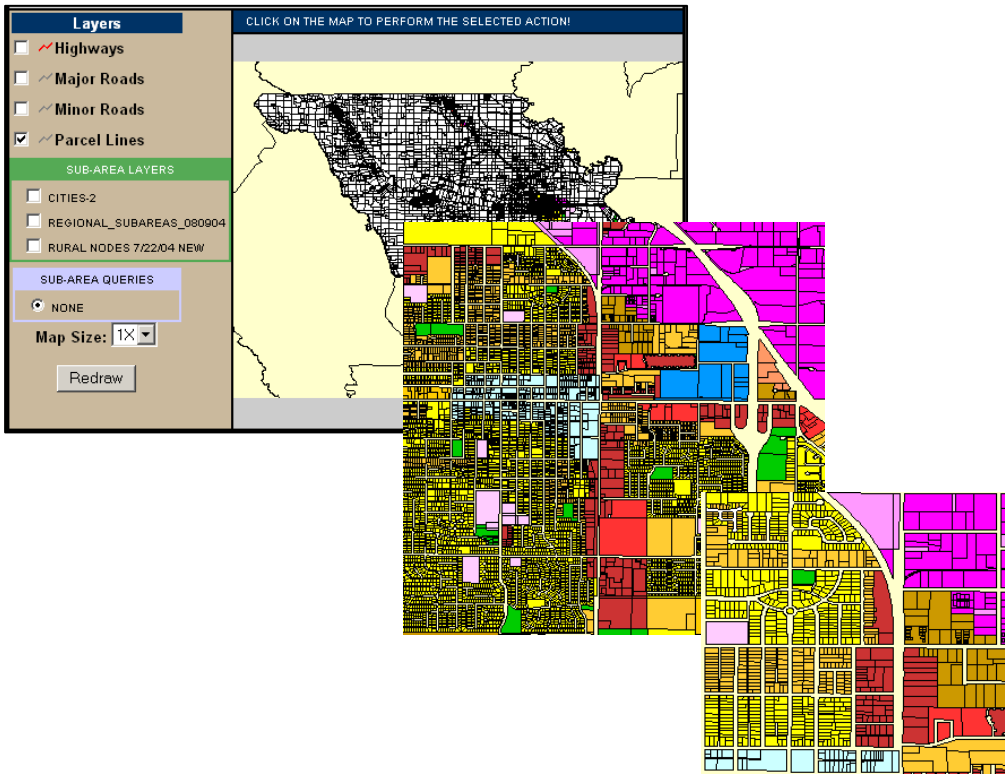
*Indicators can be calculated at the region, city or neighborhood level, or any other defined geography or subarea.*

**ROBUST :** I-PLACE3S is capable of working with detailed data at scales from neighborhood to multi-county regions, yet still provides results in real time. I-PLACE$^3$S can easily perform analysis on extremely large datasets (over 750,000 records) within a several second time-frame. I-PLACE$^3$S can easily store and process terabytes of data, distinguishing it from other land use planning tools. PLACE3S can also incorporate data from regional travel models, and can feed back its own model outputs into the regional travel model, giving it the potential to illustrate regional transportation benefits of local-level land use change.

**FLEXIBLE:** I-PLACE3S is designed for flexibility; it can be expanded by adding new or updated modules and can be customized to meet the needs of individual organizations. Any new functionality added by any one agency is made available for use or customization for all users, thus enabling synergy and cost savings between the I-PLACE$^3$S users. This flexibility has been crucial as we expand this tool for King County

as part of the HealthScape project. I-PLACE3S has been able to incorporate a robust functionality that can analyze study area demographic changes and can measure the built environment within the actual walking distance of each parcel in the study area.

**Sample I-PLACE3S Map Interface. I-PLACES uses parcel level land use data for integrated, rapid analysis at county, regional, or neighborhood scale.**




## Case Study: SACOG's Sacramento Region Blueprint Project

In 2003, the Sacramento Area Council of Governments (SACOG) launched a region wide growth analysis called Blueprint. The award-winning Blueprint project has been a resounding success in helping planners and citizens in the six county Sacramento region make informed land use choices for future growth.

I-PLACE$^3$S was used to determine how different regional growth alternatives would affect the transportation system, air quality, housing, natural resource protection, and many other issues. The Blueprint project required a high-performance, robust, planning analysis tool capable of integrated planning analysis. I-PLACE$^3$S was, however, most successful in helping SACOG work effectively with the cities and counties of the region, elected officials, and the public. Unprecedented public discussion and input was obtained during dozens of interactive planning workshops. The real value of I-PLACE$^3$S is that all the participants were working off a single common data set and all participants gained immediate feedback to easily view the ramifications of their own ideas for improving each regional, county, city or neighborhood level growth scenario. I-PLACE3S analysis helped avoid "dumbing down" the data to summary aggregations, while still providing results in real time.

By combining visualization, modeling techniques, and impact analysis, I-PLACE3 helped SACOG engage the public in well-informed discussions. In December 2004, based on

the I-PLACE3S scenario analysis, the SACOG Board of Directors adopted a regional vision for 2050 that "promotes compact, mixed-use development and more transit choices as an alternative to low density development." Since the adoption of the Blueprint vision, a number of the region's counties and jurisdictions have been implementing the principles of the vision in their planning and development processes.

I-PLACE3S and its former iteration, PLACE3S, have also been used in the following settings and locations, among others:

- The San Diego Association of Governments (SANDAG) used I-PLACE3S in the development of their Regional Comprehensive Plan. I-PLACES is also being used to assist local jurisdictions within the region in implementing compact, mixed-use, pedestrian friendly development at transit stations.
- San Diego used I-PLACE3S in a neighborhood planning process for the Mid-City neighborhood.
- In Oregon, the Lane Council of Governments (L-COG, the Eugene-Springfield region), used PLACE3S in its regional transportation plan update.
- The City of Portland used PLACE3S to analyze the impacts of redevelopment of the River District in downtown Portland.

## I-PLACE3S and HEALTHSCAPE

For the Healthscape project, we are adding two new modules to I-PLACE3S:

- **Public health** (outcomes: physical activity, BMI, walk and bike trips)
- **Climate change and air quality** (outcomes: CO2, NOX, HC, and CO; vehicle trips and VMT)

To estimate changes in these outcomes, I-PLACE3S measures changes in land use, demographics and transit/auto accessibility from one scenario to another. In King County's LUTAQH (Land Use, Transportation, Air Quality and Health) project, all of those characteristics of the built environment were associated with the outcomes above.

An updated analysis of built environment, transport, physical activity, and air pollution data in King County generated the statistical relationships that were programmed into I-PLACE3S, creating a version of I-PLACE3S that is calibrated especially for the County. To match the methodology used in the analysis, I-PLACE3S programmers added the ability to measure land use patterns within a 1-km network buffer around every parcel in a scenario.

I-PLACE3S is being tested on a case study area in White Center, the 98th Street corridor. This corridor is undergoing a potential adjustment of the zoning code to increase allowable densities and allow mixed use development. A pedestrian walkway between the Greenbridge public housing development and 98th Street is also being planned. Using I-PLACE3S, we are testing how these changes might impact public health and climate change. The White Center case study also provides a way to calibrate the new I-PLACE3S modules.